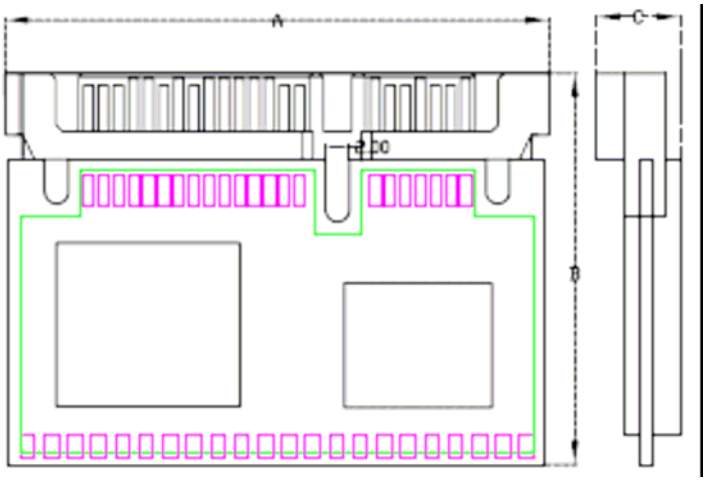
TS1-2GSDOM22V

22P Vertical Type SATA Flash Modules

Description

With a 7P Signal + 15P Power SATA interface, high speed and low power consumption, SATA Flash Modules is perfect replacement storage device for PCs, Laptops, gaming systems, and handheld devices.

Placement



Features

- RoHS compliant
- Fully compatible with devices and OS that support the SATA 1.0a 1.5Gbps standard
- Non-volatile Flash Memory for outstanding data retention
- Supports up to Ultra DMA Mode 4
- Built-in ECC (Error Correction Code) functionality and wear-leveling algorithm ensures highly reliable of data transfer
- 7P Signal + 15P Power male SATA connector
- Lower Power Consumption
- Shock resistance

Dimensions

Side	Millimeters	Inches
A	45.80 ± 0.40	1.803 ± 0.016
B	33.00 ± 0.50	1.299 ± 0.020
C	7.08 ± 0.20	0.279 ± 0.008

Specifications

Physical Specification		
Form Factor		SATA Flash Modules Vertical Type
Storage Capacities		1~2GB
Dimensions (mm)	**Length**	45.80 ± 0.40
	Width	33.00 ± 0.50
	Height	7.08 ± 0.20
Input Voltage		5V ± 10% / 3.3V ± 5%
Weight		8 g
Connector		SATA 7+15 pins combo connector

Environmental Specifications	
Operating Temperature	0 ℃ to 70 ℃
Storage Temperature	- 40 ℃ to 85 ℃

Power Requirements		
Input Voltage		5V ± 10%
2GB SATA Flash Modules Power Consumption (DC 5V @25℃)	**Mode**	**MAX (mA)**
	Write	171.1
	Read	178.8
	Standby	112.6

Reliability	
Data Reliability	Built-in 4 symbol/page correction ECC
Data Retention	10 years
Connector Durability	10,000 times

Performance				
Model P/N	**Read (KB/s)**	**Write (KB/s)**	**Random Read (KB/s)**	**Random Write (KB/s)**
2GB SATA Flash Module	49636	17519	47123	4598

* Note : 25 ℃, according to 7+15 pins combo connector test on GA-8IG1000MK, 256 MB RAM, IDE interface support UDMA4, Windows® XP Version 2002 SP2, benchmark utility HDBENCH (version 3.4006), copied file 100MB

Actual Capacity					
Model P/N	**Capacity**	**C/H/S**	**Capacity (BIOS)**	**DOS Format (Bytes)**	**Windows Format (Bytes)**
2GB SATA Flash Module	2GB	3884 / 16 / 63	2004MB	2,003,697,664	2,003,697,664

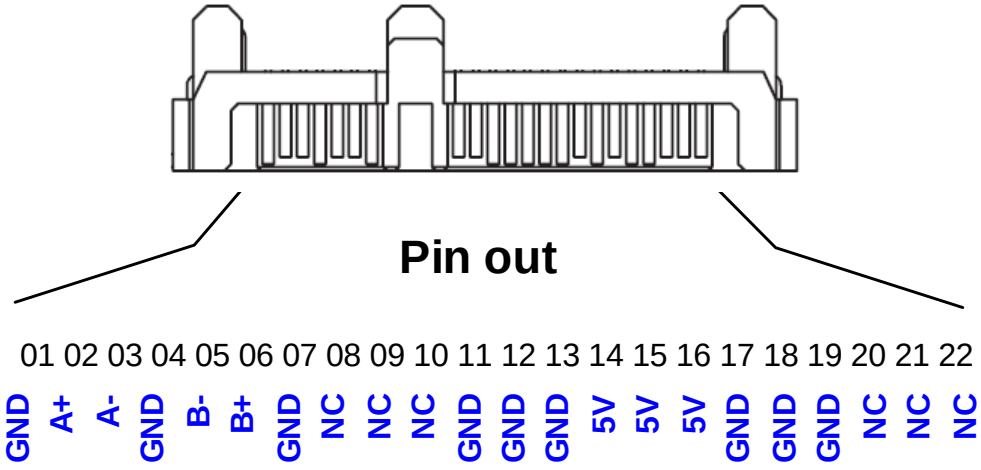
* Note: FAT format

Regulations	
Compliance	CE, FCC and BSMI

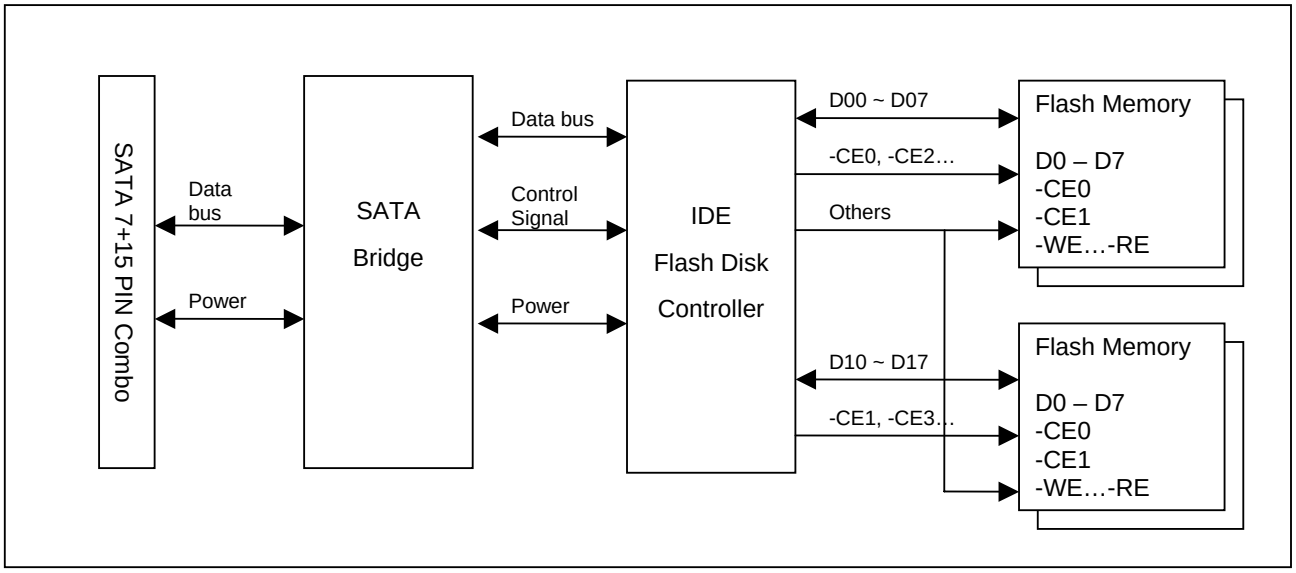
Pin Assignments

Pin No.	Pin Name	Pin No.	Pin Name
01	GND	02	A+
03	A-	04	GND
05	B-	06	B+
07	GND	08	NC
09	NC	10	NC
11	GND	12	GND
13	GND	14	5V
15	5V	16	5V
17	GND	18	GND
19	GND	20	NC
21	NC	22	NC

Pin Layout



Block Diagram



DC Characteristics

Parameter	Symbol	Min.	Max.	Unit	Remark
Supply Voltage	V_{CC}	2.97	5.5	V	
High level output voltage	V_{OH}	V_{CC} – 0.8		V	
Low level output voltage	V_{OL}		0.8	V	
High level input voltage	V_{IH}	2.4		V	Non-schmitt trigger
		2.05		V	Schmitt trigger[1]
Low level input voltage	V_{IL}		0.6	V	Non-schmitt trigger
			1.25	V	Schmitt trigger[1]
Pull up resistance[2]	R_{PU}	52.7	141	KOhm	
Pull down resistance	R_{PD}	47.5	172	kOhm	

1. Include CE1, CE2, HREG, HOE. HIOE, HWE, HIOW pins.
2. Include CE1, CE2, HREG, HOE. HIOE, HWE, HIOW, CSEL(P35), PDIAG, DASP pins.

Command Set

	Command	Code	FR	SC	SN	CY	DH	LBA	Status	Note
1	Check Power Mode	E5 or 98h	–	–	–	–	Y	–	Support	
2	Execute Drive Diagnostic	90h	–	–	–	–	Y	–	Support	
3	Erase Sector	C0h	–	Y	Y	Y	Y	Y	Not Support	#3
4	Flush Cache	E7h	–	–	–	–	Y	–	Support	
5	Format Track	50h	–	Y	–	Y	Y	Y	Support	
6	Identify Device	ECh	–	–	–	–	Y	–	Support	
7	Idle	E3h or 97h	–	Y	–	–	Y	–	Support	
8	Idle Immediate	E1h or 95h	–	–	–	–	Y	–	Support	
9	Initialize Drive Parameters	91h	–	Y	–	–	Y	–	Support	
10	Key Management Structure Read	B9 (Feature 0-127)	Y	Y	Y	Y	Y	–	NOT Support	#1
11	Key Management Read Keying Material	B9 (Feature 80)	Y	Y	Y	Y	Y	–	NOT Support	#1
12	Key Management Change Key Management Value	B9 (Feature 81)	Y	Y	Y	Y	Y	–	NOT Support	#1
13	NOP	00h	–	–	–	–	Y	–	**NOT Suppor**	
14	Read Buffer	E4h	–	–	–	–	Y	–	Support	
15	Read DMA	C8h	–	Y	Y	Y	Y	Y	Support	
16	Read Long Sector	22h or 23h	–		Y	Y	Y	Y	NOT Support	#2
17	Read Multiple	C4h	–	Y	Y	Y	Y	Y	Support	
18	Read Sector(s)	20h or 21h	–	Y	Y	Y	Y	Y	Support	
19	Read Verify Sector(s)	40h or 41h	–	Y	Y	Y	Y	Y	Support	
20	Recalibrate	1Xh	–	–	–	–	Y	–	Support	
21	Request Sense	03h	–	–	–	–	Y	–	Not Support	#3
22	Security Disable Password	F6h	–	–	–	–	Y	–	Support	
23	Security Erase Prepare	F3h	–	–	–	–	Y	–	Support	
24	Security Erase Unit	F4h	–	–	–	–	Y	–	Support	
25	Security Freeze Lock	F5h	–	–	–	–	Y	–	Support	
26	Security Set Password	F1h	–	–	–	–	Y	–	Support	

27	Security Unlock	F2h	–	–	–	–	Y	–	Support	
28	Seek	7Xh	–	–	Y	Y	Y	Y	Support	
29	Set Feature	EFh	Y	–	–	–	Y	–	Support	
30	Set Multiple Mode	C6h	–	Y	–	–	Y	–	Support	
31	Set Sleep Mode	E6h or 99h	–	–	–	–	Y	–	Support	
32	Standby	E2 or 96h	–	–	–	–	Y	–	Support	
33	Standby Immediate	E0 or 94h	–	–	–	–	Y	–	Support	
34	Translate Sector	87h	–	Y	Y	Y	Y	Y	Not Support	#3
35	Wear Level	F5h	–	–	–	–	Y	–	Support	#4
36	Write Buffer	E8h	–	–	–	–	Y	–	Support	
37	Write DMA	CAh	–	Y	Y	Y	Y	Y	Support	
38	Write Long Sector	32h or 33h	–	–	Y	Y	Y	Y	Not Support	#2
39	Write Multiple	C5h	–	Y	Y	Y	Y	Y	Support	
40	Write Multiple w/o Erase	CDh	–	Y	Y	Y	Y	Y	Not Support	#3
41	Write Sector(s)	30h or 31h	–	Y	Y	Y	Y	Y	Support	
42	Write Sector(s) w/o Erase	38h	–	Y	Y	Y	Y	Y	Not Support	#3
43	Write Verify	3Ch	–	Y	Y	Y	Y	Y	Support	

#1: This command is optional, depending on the key Management scheme in use.

#2: Use of this command is not recommended.

#3: CFA feature set command is not supported by P-ATA to S-ATA bridge controller.

#4: If Security command 22~27 are supported, this command is not supported.

Definitions

FR = Features Register

SC =Sector Count register (00H to FFH, 00H means 256 sectors)

SN = Sector Number register

CY = Cylinder Low/High register

DH = Head No. (0 to 15) of Drive/Head register

LBA = Logic Block Address Mode Support

– = Not used for the command

Y = Used for the command

SMART Command Set

- SMART Command Set

SMART Feature Register Values			
D0h	Read Data	D4h	Execute OFF-LINE Immediate
D1h	Read Attribute Threshold	D8h	Enable SMART Operations
D2h	Enable/Disable Autosave	D9h	Disable SMART Operations
D3h	Save Attribute Values	DAh	Return Status

1. If reserved size is below the Threshold, the status can be read from Cylinder register by Return Status command (DAh).

- SMART Data Structure

BYTE	F / V	Decription
0-1	X	Revision code
2-361	X	Vendor specific
362	V	Off line data collection status
363	X	Self-test execution status byte
364-365	V	Total time in seconds to complete off-line data collection activity
366	X	Vendor specific
367	F	Off-line data collection capability
368-369	F	SMART capability
370	F	Error logging capability 7-1 Reserved 0 1=Device error logging supported
371	X	Vendor specific
372	F	Short self-test routine recommended polling time (in minutes)
373	F	Extended self-test routine recommended polling time (in minutes)
374	F	Conveyance self-test routine recommended polling time (in minutes)
375-385	R	Reserved
386-395	**F**	**Date Code**
396	**V**	**Number of MU in device (0~n)**
397+(n*6)	**V**	**MU number**
398+(n*6)	**V**	**MU data block**

400+(n*6)	**V**	**MU spare block**
401+(n*6)	**V**	**Init. Bad block**
402+(n*6)	**V**	**Last Defect Bad block (Newest state)**
511	V	Data structure checksum

F=the content of the byte is fixed and does not change.

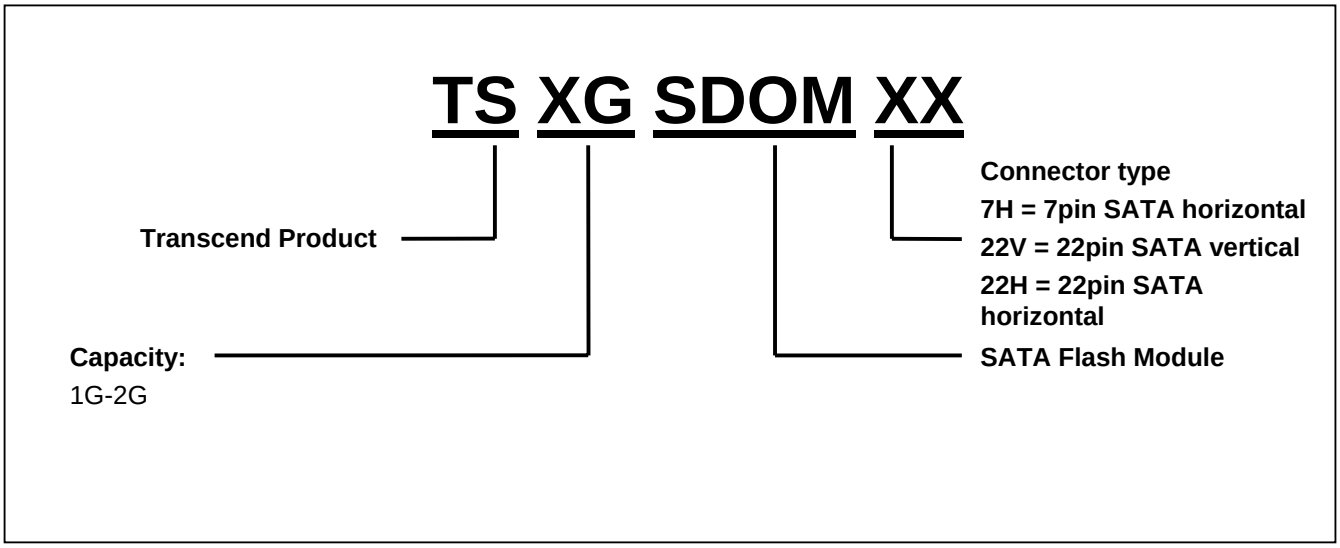
V=the content of the byte is variable and may change depending on the state of the device or the commands executed by the device.

X=the content of the byte is vendor specific and may be fixed or variable.

R=the content of the byte is reserved and shall be zero.

* 4 Byte value : [MSB] [2] [1] [LSB]

Ordering Information



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